

Foreign Exchange

Financial management of a company is a complex process and it is made even more complex because of the globalisation taking place, which is making the world financial and commodity markets more and more integrated. The integration is both across countries as well as markets. Not only the markets, but even the companies are becoming international in their operations and approach. This changing scenario makes it imperative for a student of finance to study international finance.

In a globalised environment, the importance of international finance can never be overemphasized. All companies are affected by changes in interest rates –

- 1) Consider firms, who are having foreign exchange operations, say exporters and importers- Exporter is benefitted by home currency depreciation, while importer is benefitted by home currency appreciation. Similarly, if firm invests abroad, and is expecting foreign currency receivable later on, it would wish the home currency to depreciate. Borrowers, on the other hand, would want home currency to appreciate.
- 2) Consider a purely domestic Indian company, which sells products in India, but these products are also sold by competitors, who import the same. If Re. appreciates, the cost of import decreases. The importers may, therefore, reduce the price of a product in India. The Indian company, may in that situation loose either in terms of market share or profit margin.
- 3) Consider a purely domestic Indian company, which does not face any foreign competition. It will still be affected by foreign exchange changes. This is due to the fact the foreign exchange market, money market, commodity market, etc. are integrated. Thus, a change in exchange rate may bring about a change in interest rate and inflation, which will affect even the purely domestic company.

The Foreign Exchange Market is an over the counter market where foreign currencies are bought and sold against one other: The term “Over the Counter” implies the lack of a physical place. RBI regulates the market and like all regulators, it would want the market to be liquid, deep and efficient. In order to achieve tis objective, RBI has appointed Banks to act as market makers. They are called authorized dealers (AD’s).

Exchange Rate Quotations

Exchange Rate may be defined as the price of one currency in terms of another. There are two types of exchange rate quotations –

- **Direct Quote** i.e. number of units of home currency per units of foreign currency. For example: $1\$ = \text{Rs.}46.50$; $1\text{£} = \text{Rs.}72.50$, etc.
- **Indirect Quote** i.e. Number of units of foreign currency per unit of home currency. For example: $\text{Pte}/\text{Rs.} = 0.0357$ (Pte stands for Spanish Peseta); $\text{CHF}/\text{Rs.} = 0.0157$ (CHF stands for Swiss franc); $\text{DM}/\text{Rs.} = 0.0168$ (DM stands for Deutche Marks)

RBI requires AD’s to furnish direct quotes.

Market Making

RBI has appointed banks as authorised dealers, and therefore banks act as market makers. Market maker is a person who quotes two prices for a commodity – BID Rate and ASK Rate. Examples:

- Bank A quote- Rs/Yen 100= 2.1450/2.1560

The above quote implies that Bank A is bidding for Yen 100 at Rs.2.1450 and is asking Rs.2.1560 to sell Yen 100. From customers point of view the rate for buying 100 Yen is Rs.2.1560 and the rate for selling 100 Yen is Rs.2.1450.

Bid – Ask Spread

The bid ask spread is meant for covering the

- Covering the expenses of the bank in the dealing business
- Risk Premium
- Normal Profit

Bid ask spread is a function of three factors

- Exchange rate volatility (positive function)
- Competition between market makers (negative function)
- Volume or turnover (negative function)

Two Way Arbitrage

Arbitrage may be defined as any activity that will generate profit without any investment and without any risk. Two way arbitrage in the forex market involves buying one currency say dollar from a bank and instantly selling it to some other bank resulting in profits.

The rates quoted by different banks between the same currencies are not identical, however the rate quoted by them overlap in such a manner that there is no scope for arbitrage.

Three Way arbitrage

Three- way arbitrage involves three currencies say X, Y Z and three banks say A, B, & C. The steps involved are:

- Step 1- Convert currency X into Y through Bank A
- Step 2- Convert Y into Z through Bank B
- Step 3- Convert Z into X through bank C

If we end up having greater amount of X in step 3, than we started with in step 1, there is a scope for three way arbitrage.

Cross Rates & Three way Arbitrage

In the Forex market it is a practice to quote most of the currencies against the dollar, and to calculate the exchange rates between other currencies with dollar as the intermediate currency.

For example, the DM/£ rate will be calculated through the Dm/ \$ and the \$/ £ quote. The DM/ £ rate thus calculated is called a **cross rate or the synthetic rate**.

Spot Rates and Forward Rate

Spot rate is the rate applicable for delivery, two business days ahead. Thus if a firm buys \$100000 spot on Monday, the 23rd @ Rs40/ \$, the firm will pay Rs40 lacs and receive \$100000 on Wednesday, the 25th.

Forward rate is the rate fixed in a forward contract. A forward contract in the currency market refers to a contract to buy/sell a certain amount of a foreign currency at a predetermined rate i.e. forward rate, on a predetermined date (maturity date). Forward rates are used extensively by exporters & importers to hedge their foreign currency payable or receivable.

Forward rates are generally used by importers and exporters to hedge against foreign exchange risk. Risk refers to uncertainty. For instance, an Indian importer has \$100000 payable after two months. So, he is afraid of dollar appreciating against rupee.

Forward Premium & Discount on a Currency

Both spot rates and forward rates are determined by demand & supply forces. If the forward rate (F) is higher/ lower than the spot rate (S), the denominator currency is said to be at a forward premium/ discount.

Annualised forward premium = $\frac{F-S}{S} \times 100 \times \frac{12}{n}$ where,

F= forward rate, S= spot rate, n= maturity.

A negative answer would imply discount.

Note: On account of the base effect, discount is slightly less than the premium.

Swap Points

Generally forward rates are not given to us. Instead spot rate and swap points are given. Swap points are a difference between the spot rate and forward rate (generally representing the very last decimal places depending on the quote).

If the swap points are low/ high, they are to be added and if they are high/ low, they are to be deducted.

Option Forward Contract

This is a special type of forward contract where the customers enjoy the option to take or make delivery of the foreign currency at any time during a certain period in future. The bank will give an unfavourable quote.

Retail Market

Based on the parties to the transaction, foreign exchange transactions can be categorized into three types:

1. Between the RBI and the Dealers.
2. Inter Bank market i.e. Wholesale Market (Bank to Bank).
3. Retail Market (customer and corporate with bank).

The rates quoted in the retail market are known as the Merchant or Telegraphic transfer (TT rates). These are based against the retail consumer and are computed with the help of TT buying and selling commission.

For example: Bank A quoted in the interbank market-

Rs/ \$ = 45.40/ 90

T.T. buying commission = .12%

T.T. selling commission = .1%

T.T buying rate refers to the rate at which bank buy from a retail customer = Interbank Bid rate-
 TT buying commission = $45.4 - (0.12\% \text{ of } 45.4) = 45.35$

Currency of Borrowing & Investment

If a company borrows in its home currency, the home currency interest rate is what matters. If it borrows foreign currency, it will have foreign currency payable. If it decides to hedge the same through forward contract, the forward premium or discount on the foreign currency with respect to the home currency along with the foreign currency interest rate would come into play. It would obviously choose the currency of borrowing which would result in the lowest home currency outflow on maturity on a covered basis.

Similarly in case of investing, it would choose the currency of investment which would result in the highest home currency inflow on, maturity on a covered basis.

Exchange Rate Determination

Exchange rates are determined by demand and supply forces. These forces are shaped by a number of forces-

- Inflation rates
- Interest rates
- Fiscal Deficit
- Monetary Policy etc.

It is next to impossible to determine with certainty the collective influence of all these factors on exchange rates. In this topic we study the relationship between-

- 1) Exchange rates and Interest Rates (IRP)
- 2) Exchange rates and Inflation (PPP)

Interest Rate Parity (IRP)

IRP establishes a relationship between exchange rate and interest rates. If interest rates on currency B is greater than A, currency B should be at a forward premium. i.e.

If, $IB < IA$, then

$$F(A/B) > S(A/B)$$

To be more specific, the annualised forward premium on currency B should approximately be equal to the interest rate differential.

$$\text{i.e. } \frac{F(A/B) - S(A/B)}{S(A/B)} = \frac{iA - iB}{1 + iB}$$

Thus, if Re and \$ interest rates are 10% p.a. and 4% p.a. respectively-

- i. \$ should be at a forward premium of approximately 6% and exactly by $6/1/1.04 = 5.77\%$
- ii. Re should be at forward discount of approximately 6 % and exactly by $6/1.1 = 5.45\%$

The above formulas assume that we have one year forward rates.

The fact of matter is that RBI guidelines do not permit forward quotations beyond 6 months. So, in the context of forward rates for more than 1 year, IRP is given by-

$$\frac{F}{S} = \frac{1 + niA}{1 + niB}$$

Example:

Given Spot (Rs./\$) = Rs.47.5

6 month Re. interest rate = 9% p.a.

6 month \$ interest rate = 5% p.a.

Solution: 6 Month forward rate can be calculated as follows:

$$\frac{F}{S} = \frac{1 + niA}{1 + niB}$$

$$\frac{F}{47.5} = \frac{1 + (0.5 \times 0.09)}{1 + (0.5 \times 0.05)}$$

$$F = \frac{47.5 \times 1.045}{1.025} = \text{Rs.}48.43$$

Purchasing Power Parity (PPP)

The Value of money may be defined as the amount of goods and services which money can command. Due to inflation, the value of money falls. So, if US has a lower inflation than India, there would be a lower decline in the purchasing power of dollar as compared to Rupee. So, dollar should appreciate against rupee. More specifically if the inflation rates in US and India are 2% and 5% respectively- Dollar should appreciate approximately by 3% and exactly by $3/1.02 = 2.94\%$.

Rupee should depreciate against dollar approximately by 3% and exactly by $3/1.05 = 2.85\%$.

PPP is based on the law of one price i.e. the price of a commodity throughout the world should be same when expressed in terms of common currency. This is required to ensure that there is no commodity arbitrage (assuming that there are no transportation costs and trade barriers).

Let us imagine a common basket of commodities which is priced at \$10 in US and Rs500 in India. So, we have:

$$\text{\$10} = \text{Rs. 500}$$

$$\text{Therefore, \$1} = \text{Rs. 500/10}$$

$$= \text{Rs. 50/\$}$$

Now there is inflation of 2% in US and 5% in India. So, we have-

$$\text{\$10.2} = \text{Rs. 525}$$

$$\text{\$1} = \text{Rs.51.40}$$

This exchange rate that should prevail as per PPP is known as the **Real Effective Exchange Rate (REER)**. This can be computed with the help of formula given by-

$$\frac{S_1(A/B)}{S(A/B)} = \frac{1 + nIA}{1 + nIB}$$

Where, n= number of years

Forward Cover Vs Money Market Cover

Earlier we had discussed that the only method of hedging was by means of entering into a forward contract. However, the discussion on IRP has established a certain relationship between spot rates, forward rates, and interest rates. Owing to this relationship, the forward rate might be undervalued/ overvalued. So, we now propose our alternative method of hedging – Money Market Cover (Class Notes).

Roll Over Forward Contracts

In India the maximum maturity of a contract is 6 months. However, a company may be having a foreign currency receivable or payable maturing beyond 6 months. To hedge such exposure there is a technique called roll over forward cover. This involves covering the exposure through a 6 month forward contract as if the exposure matures in 6 months. At the end of 6 months the forward contract is honoured by a spot transaction & a fresh 6 month forward contract is entered. This process is continued till the maturity date. In this manner the company is covered throughout the tenure of the payable or receivable. It is therefore protected from significant changes in exchange rate. However due to continuous buying & selling it results in significant transaction cost. So roll over strategy would turn out to be profitable only if there is a significant adverse movement in exchange a rate.

Types of Foreign Exchange

Exposure & Risk – There are 3 types of foreign exchange exposures: -

1. Transaction Exposure

2. Operating or Economic Exposure
3. Translation or Accounting Exposure

Transaction Exposure – It deals with a firm having a known foreign currency payable or receivable, the foreign currency equivalent of which is known with certainty but the home currency equivalent is uncertain. This exposure arises only when a firm enters into a foreign transaction by virtue of which it comes to have a foreign currency payable or receivable, the amount of which is known with certainty but the home currency equivalent of it is uncertain. So this exposure will arise only due to exports, imports, foreign borrowing and investments etc. A purely domestic firm will not face this exposure.

The techniques designed to hedge this exposure may be broadly divided into two –

- ❖ Internal hedging techniques
- ❖ External hedging techniques

Methods of hedging transaction exposure [V.I. for theory]

Internal hedging techniques

The firm will hedge in the normal course of business

- a. Invoicing
- b. Leading & Lagging
- c. Outsourcing
- d. Netting

External Hedging techniques

The firm will hedge by entering into a separate contract

- a. Forward Cover
- b. Money Market Cover
- c. Futures Cover
- d. Options Cover

Internal Hedging Techniques: The firm tries to hedge the exposure in the normal course of business i.e. without entering into an external contract. These include –

Invoicing – Invoicing as an internal hedging technique involves drawing the invoice in home currency. Thus, if the terms of the trade permit, an Indian importer / exporter should have the invoice drawn in INR. Normally, invoice is drawn in the seller's currency. However, if the bargaining power of the buyer is high, it could be otherwise. Invoicing may be in a third currency or there may be a case of dual invoicing i.e. invoicing partly in the seller's currency & partly in the buyer's currency.

Leading & Lagging – This implies:

- Lead the payable in a strong currency
- Lag the payable in a weak currency

- Lead the receivable in the weak currency
- Lag the receivable in a strong currency

Outsourcing – It involves outsourcing the inputs and business process requirement from the country to which the firm is presently exporting. Thus, if an Indian company is exporting to US, it has \$ receivable and is therefore afraid of \$ depreciating. To hedge the same, it should start importing from US.

Netting – This implies setting off the payable and receivable in the same currency, thereby, reducing transaction cost. It is especially prominent in the case of multinational companies having subsidiaries all around the world.

Example: An Indian company has \$ 100,000 payable and \$ 30,000 receivable from a UK company. The following rates are quoted –

$$\text{RS}/\text{£} = 74.60/10$$

$$\text{\$/£} = 1.40/1.45$$

Calculate the benefit of netting for the Indian and UK Company

Example: An Indian company has a \$ 100,000 payable after 3 months. The US exporter is agreeable to grant a discount of \$ 3,000 in case of prompt payment. The following information is furnished –

$$\text{Spot (Rs /\$)} = 45.60/$$

$$3 \text{ month swap points} = 10$$

The cost of short term funds for the Indian firm is 13% p.a. Advice the firm

External Hedging Techniques –

- Forward Cover
- Money Market Cover
- Futures
- Options
- Financial Swaps

Operating or Economic Exposure

This exposure is faced irrespective of whether a firm entered into a foreign transaction or not. Thus consider an Indian firm which uses all its inputs in India to produce the output which is sold only in India. Moreover, it does not borrow or invest abroad. Even such a firm may be exposed to exchange rate fluctuations.

For instance, the firm's competitors import the same product from US and sell it in India. If Rupee appreciates against Dollar, the importers gain. They may therefore reduce the price of their

product. The Indian firm stand to suffer either in the form of lower market share or lower market share or lower profit margins.

Exchange rate, interest rate and inflation are interlinked. So a change in exchange rate may bring about a change in interest rate and inflation which would affect even a purely domestic Indian firm.

Example: Suppose, there is sudden spurt in oil prices which increases Indian oil import bill significantly. The resultant demand for \$ tends to push up the rupee dollar exchange rate very steeply.

Though in India we have a floating exchange rate system i.e. Exchange rates are supposed to be determined by the free forces of demand and supply, yet in reality it is a managed float/dirty floats. So, RBI frequently intervenes in the Forex market to smoothen out steep changes in Exchange rate. In the present case RBI may sell \$ reserves to bring down the exchange rate.

Sale of \$ reserves implies corresponding buying of rupee from the market which will decrease the money supply.

A higher interest results in a higher cost of borrowing for the Indian company.

Moreover, a lower money supply implies a lower rate of inflation, which would affect the purely domestic company both on the cost side and revenue side. The ultimate impact of which is situation specific.

It need to be entertained that even a firm having a foreign currency payable or receivable whose amount is not known with certainty is subject to operating exposure.

Even if an Indian Exporter to US invoices in rupee, changes in exchange rate will bring about a change in the dollar equivalent price. Given the price elasticity, there will be a change in the demand for the product. For instance the exporter is invoicing at Rs.5000 per unit and the initial exchange rate is Rs.50/\$.

So the \$ equivalent price is $5000/50 = \$100/\text{unit}$

At this price there is a demand for 10,000 units. Now, suppose dollar appreciates to Rs.55/\$. Therefore, the dollar equivalent price = $5000/55 = \$90.91/\text{unit}$

So price has fallen by 9.09%

Suppose, the price elasticity of demand $e_p = -2$

Therefore, demand will go up by $= 9.09 \times 2 = 18.18\%$

So new quantity sold $= 10,000 \times 1.1818 = 11,818$

So the exporter is able to sell more.

Transaction or Accounting exposure

This exposure relates to the translation of the financial statements of foreign branches or subsidiaries into the parent company's home currency. This translation takes place at different rates and may result in some translation gain or loss. However, this loss or gain is not accompanied by any cash flow and is therefore purely notional. There is no need to manage this exposure. However investors may not be matured enough to understand notional feature of this loss or gain and may treat the same as real. This would affect share prices and in such a situation it becomes necessary to manage even this exposure.

SWAPS

Swap is an exchange of foreign currencies. There can be two types of Swap –

Buy – Sell Swap (Swap in) i.e. buy spot and sell forward.

Sell – Buy (Swap out) i.e. sell spot and buy forward.

The two parties, the two currencies and the amount of one currency must be the same in a swap transaction. The exchange rate for a swap transaction is normally better than normal transaction. These would either be given to us or are to be determined by the method explained below: -

Given, Spot (Rs/\$) = 45.50/45.90

3 Months swap points = 30/40

Thus, if Mr. X wants to enter into a \$ 100,000 buy-sell swap, He would buy \$100,000 spot Rs.45.9 per \$ and sell \$100,000, 3 month forward at Rs.45.9 + 0.3 i.e. 46.2/\$ (i.e. adjustment of swap points will be made with the spot rate fixed on the swap).

In the case of sell-buy swap, the customer will sell \$ 1, 00,000 at Rs. 45.5/\$ and buy it 3 months forward at 45.5 + 0.4 i.e. Rs. 45.9 / \$

Cancellation, Extension & Early delivery of a forward contract

In India, forward contract are allowed only for hedging purpose. Thus, we can buy/sell dollar forward only if we have an underlying dollar payable/receivable, say by virtue of an import/export. However, the import/export order in pursuance to which the forward contract was entered may get cancelled/extended or premature. In such cases, the underlying forward contract has to be cancelled/extended/early delivered. The procedure of settlement with a bank in such a case will be done in accordance with RBI regulation and the guidelines of the foreign exchange dealers association of India (FEDAI).

Cancellation: This implies entering into an opposite contract. The profit/loss to the customer will be credited/debited to his account. Also as per FEDAI guidelines, a flat cancellation fee of Rs.100 shall be charged.

Extension: This involves cancellation of the old forward contract and entering into a fresh forward contract for the extended maturity. A flat extension fee of Rs.100/- will be charged as per FEDAI guidelines.

Early Delivery:

Case I – Early delivery with cancellation

Case II – Early delivery without cancellation

In the 1st case, the old contract will be cancelled and a new spot contract will be entered for early delivery. The profit/loss on cancellation will be computed as usual. Early delivery fee Rs.100 as per FEDAI. In the 2nd case, the old contract is not cancelled. Instead, it is executed at the old contractual rate on the early delivery date. For such execution, the concerned bank enters into a buy-sell or a sell-buy swap. The swap gain/loss if any is transferred to /charged from the customer. Time value considerations are also involved. Thus, the bank charges/pays interest on the net outflow/inflow on the date of early delivery. A fixed early delivery fee of Rs.100 is levied as per FEDAI guidelines.

Foreign Direct Investments (FDI)

The foreign Investment is the acquisition of assets in another country by a foreign entity – be it government, an institution or an individual. A country, vest in foreign direct investment (FDI) for its growth, if its savings are insufficient for productive investment in comparison to the demand. In such cases, the FDI can be a vehicle for stimulating growth. The FDI is imperative to economic development of a country. Above all it brings in new technology and management concepts that pave the way to judiciously utilize the resources, thereby increasing the productivity and finally hold a chunk in the business globally. Institutionalisation is one of the biggest advantages of FDI. It enforces the discipline and stability at market place and market dynamics taken care of the rest. It prepares the country to play and improve its horizon in global perspective and helps it to come out of its shell.

The presence of FDI is of definite help to a country mainly because there will be a better access to information and better monitoring capabilities. Studies also reveal that corporate governance and performance of the stock markets are positively related and the nations and firms with feeble corporate governance practices experience a bigger fall down when struck by adverse shocks and their currencies are subject to higher fluctuations. The biggest service a corporate can provide to society is the profit it generates in accounting terms and wealth creation in general. The discipline of value creation through innovation could be a lesson that can be learnt from FDI. The FDI can insist and lead to corporate integrity, transparency in decision making and direct it in the best interests of the shareholders.

Major Initiatives taken by Government of India to attract FDI are as follows:

- FDI up to 100% permitted under the automatic route in the advertising sector. FDI under the automatic route up to 100% is available for film sector and will not be subject to conditions about debt equity ratio, minimum level of equity investment etc.
- FDI up to 100% allowed in tea sector, including tea plantations, permitted subject to compulsory disinvestments of 26% equity in favour of Indian partner within a period of five years and prior approval of the state government in case of any future land use change.

- Re-issuance of ADR/GDR permitted to the extent of ADRs / GDRs which have been redeemed into underlying shares and sold in the domestic market.
- FDI up to 100% permitted with prior approval of the government for development of integrated township, including housing, commercial premises, hotels, resorts, and regional level urban infrastructure facilities such as roads and bridges and mass rapid transit system.
- Automatic route in FDI up to 100% allowed in all manufacturing activities in special Economic zones, except some of the activities such as arms and ammunitions, explosives and allied items of defence equipment, defence aircrafts and warships, automatic substances, narcotics, distillation and brewing of alcoholic drinks and cigarettes and cigars.
- FDI in print media sector allowed up to 26% of paid-up capital of Indian entities publishing periodicals and newspapers dealing with news and current affairs.

International Project Appraisal

As against a domestic project, an international project is exposed to new sources of risk such as currency risk, country risk, repatriation risk etc. Moreover, there are certain issues involved in international projects which are not encountered in domestic projects such as international taxation, blocked funds, transfer pricing, illegal transfers, etc. This makes the NPV criterion unsuitable for international project evaluation. Instead we apply the Adjusted Present Value (APV) criterion.

However, in our curriculum, such complicated issues are not given. In the absence of such issues, we can apply the NPV criterion by two methods – domestic currency approach and foreign currency approach. Both will yield the same result.

Foreign Exchange – Question Bank

1. An industrial unit in Chennai exports washing machines to Dubai at a price of \$ 150 per unit. The company executed an order for the supply of 12,000 units in December 2002. The company uses Japanese motors for the washing machines and the cost of each motor is \$550. Its other variable costs per unit are Rs. 4, 200. The allocable fixed costs of the company are Rs. 12, 00,000. The spot rate of dollar in December 2002 is Rs. 48. If rupee appreciates to Rs. 47 per dollar, you are required to find out by how many units the company should increase its sales, so as to maintain the current profits.
2. An Indian importer has a payable of £ 1, 00,000. The seller has given the Indian importer the following two options.
 - i. Pay immediately with a cash discount of 1% on the payable.
 - ii. Pay after 3 months with interest at 4% p.a.

The borrowing rate for the importer in Rupees is 12% p.a. The following are the exchange rates as on December 02, 2002.

Rs. / Pound Spot	74.76/ 80
3 month forward	38/ 40

Which of the following two options is advisable for the importer?

3. An importer in UK has a payable of Euro 500,000 after 3 months. He has collected the following information from his banker.

Euro/ £ Spot:	1.4200/ 1.4210
3 month forward:	1.4245/ 1.4256

3 month interest rates p.a.

Euro:	2.60% - 2.80%
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£	3.00% - 3.20%
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Which of the following would you recommend for covering the exposure through?

- a. Forward market
 - b. Money market
4. On April 01, 2003 Swastika Industries, a leading steel importer from Mumbai obtained a forward contract from Citibank Mumbai to buy US \$ 1 million for settling their payable to the supplier in Germany on May 31, 2003. The US Dollars were quoted in the local interbank market as under:

April	01, 03 (Rs. / \$)
Spot	47.19/ 20
1 month forward	9/10 paisa
2 month forward	19/ 20 paisa

On May 01, 2003 the supplier informs the importer that the consignment can be shipped and delivered in June 2003. Hence the importer requested Citibank Mumbai to extend the contract to June 30, 2003. The US Dollars were quoted in the local inter- bank market as under:

May 01, 2003 (Rs. / \$)

Spot	47.02/ 03
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1 month forward	7/ 8 paisa
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2 month forward	13/ 14 paisa
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Citibank Mumbai quoted the exchange rates by loading a margin of 0.20%. The bank further agreed to offer a better rate by 4 paisa while quoting the rates to the importer.

You are required to calculate the

- a. Extension charges
 - b. Net cash outflow of the company as on June 30, 2003.
5. An Indian company based at Mumbai needs short term funds of Rs. 50 million for a period of 3 months. The company collected the following information from its banker:

	Rs. / \$	Rs. /£
Spot	48.50/ 55	74.05/ 10
3 month forward	45/ 50	85/ 90
3 month interest rates p.a.		
Rs. 9%		
\$ 4%		
£ 6%		

You are required to calculate the annualized effective cost of borrowing,

- a. If the company borrows in USD and
 - i) Covers the exchange rate risk through forward market
 - ii) Keeps the position open and the spot rate after 3 months turns out to be Rs/ \$ 48.90/ 95.
 - b. If the company borrows in pounds and
 - i) Covers the exchange rate risk through forward market
 - ii) Keeps the position open and spot rate after 3 months turns out to be Rs/ £ 74.75/ 80.
6. An Indian importer has a payable of C\$ 5, 00,000 due on 31.3.2002. On 01.01.2002, the importer covers the payable through forward buying of C\$ at Rs. 30.34 from his banker. On 31.3.2002, he requests the banker to extend the contract till 30.4.202. The exchange rates as on 31.3.2002 are
- | | |
|-----------------|-----------|
| Rs/ C\$ spot | 30.54/ 63 |
| 1 month forward | 30.56/ 68 |
- You are required to find out the net cash flow for the importer. Also state how the bank will cover this extension of forward contract.

7. The treasurer at an Indian company requires Rs.10 million six months. He is exploring various options of financing and has collected the following information:

	Rs./ \$	Rs./£	
Spot	46.90/95	65.35/40	
6m forward	70/90 paisa	90/100 paisa	
Expected spot rate after 6m	47.50/55	66.90/95	
Interest Rate:	Rs.	\$	£
6 months	12.00%	4.00%	5.00%

You are required to advise the treasurer in which currency to borrow, if he

- i. Covers the exchange risk in forward market
 - ii. Keep the open position
8. A company based in U.S. has surplus funds to the tune of \$5,00,000 for 3 months. The company has obtained the following quotes/information from its bank:

\$/Euro Spot : 0.9079/0.9083
 3 months forward : 5/33

\$/£ Spot : 1.4554/1.4558
 3 months forward : 54/51

3 months interest rate: \$: 3.00%
 4.00%
 2.50%

You are required to advise the company as to the currency, in which it should invest to have more inflow of dollars.

9. The rates available in the market are:

Rs/\$ Spot = 43.78/79

£/\$ Spot = 0.5285/86

If an Indian promoter requires pounds, what is the rate quoted to him?

10. Given the following:

\$/£ 1.3670/1.3708

SFr/DM 1.0030/1.0078

\$/SFr 0.8790/0.8803

And if, DM/£ in the market are 1.5560/1.5576, find out if any arbitrage opportunity exist. If so, how can \$ 10000 available with you be used to generate risk-less profit?

11. An Indian co. needs to borrow funds for 1 year. It can do so at an interest rate of 10% p.a., in India. Instead, it may do so from U.S. at an interest rate of 4%. Instead, it may do so from Switzerland at an interest rate of 2% p.a. Withholding tax of 15% is applicable in case of funds borrowed from abroad. Assume IRP holds good, in which currency should it borrow?

12. An Indian firm is evaluating a 4 year project in USA. The net cash flow are as shown below:

Year	0	1	2	3	4
Net cash flow(in lacs dollars)	(50)	15	15	15	15

Presently, spot rate is Rs. 48/ \$. Risk free interest rates in India and US are 10% p.a. and 4% p.a. respectively. The rate of return required from the project by the Indian shareholders is 18% p.a. calculate the NPV of the project-

- a) From domestic currency point of view
 b) From the foreign currency point of view.

13. Consider the following quotations by banks A, B and C?

A \$/£ 2.0530/ 2.0570

B €/ \$ 0.9050/ .9070

C £/ € 0.6250/ .6390

- a. Find out the implied €/ \$ rate with the help of the rates quoted by A & C and check for arbitrage.

- b. Find out the implied \$/ £ rate with the help of the rates quoted by B & C and check for arbitrage.
- c. Find out the implied £/ € rate with the help of the rates quoted by A & B and check for arbitrage.

14. Given spot Rs/ \$ = 42
6 month forward Rs/ \$ = 42.80

- a. Find out the annualised forward premium/ discount on \$ against Rs.
- b. Find out the annualised forward premium/ discount on Rs. Against \$.

15. Based on the 3 month forward rate of Rs. 85.70/ £, the annualised forward premium on £ against Rs. Happens to be 9%.
Find out the annualised forward premium/ discount against £ based on 6 month forward rate of Rs 89/ £.

16. Based on the 3 month forward rate of Rs. 51.65/ €, the annualised forward premium on € against Rs. Happened to be 4%. Find out the 6 month forward rate (Rs/ €) given that the annualised discount on Rs against € based on 6 month forward rate is 7%.

17. On the 1st of Jan, an Indian firm knows that it has ¥ 50, 00, 000 payable and £ 40, 00, 000 receivable, sometimes in the month of February. The firm decides to cover both the exposures via option- forward contracts.

The following quotations are provided

Spot Rs/ ¥ 100	= 32.64/ 32.95
1 month swap points	= 15/ 10
2 month swap points	= 20/ 15
Spot Rs/ £	= 86.90/ 70
1 month swap points	= 20/ 30
2 month swap points	= 30/ 40

Find out the rates that will be quoted to the Indian firm.

18. Given 3 month forward rate Rs 52/ €.

3 month interest rates

Rs = 8% p.a.

€ = 4% p.a.

Find out the spot rate

19. Based on 3 month forward rate of Rs 86/ £, the annualised forward discount on Rs against £ happens to be 55. Find out the £ interest rate given that 3 month Rs interest rate is 9% p.a.

20. An Indian firm borrows \$ 50, 000 for 4 years at an interest rate of 6% p.a. on bullet repayment basis, the interest being paid annually.

Presently the spot rate is Rs 42/ \$. The expected annual inflation in India and US are given below.

Year	(India)	(US)
1	6%	2.5%
2	5%	2.2%
3	5.5%	2%
4	4.5%	1.5%

Find out the effective cost of \$ loan in Rs term assuming PPP holds good.

21. On the 1st of Jan, an Indian importer/ exporter had a \$ 100000 payable/ receivable after 3 months. The following rates were quoted.

	Interbank rates	Retail rates
Spot Rs/ \$	40.25/ 70	40.19/ 78
3 month points	10/ 15	8/ 20

Thus, the importer/ exporter covered itself forward. However on 1st of Feb, the importer/ exporter opted for early delivery. The following quotations are available.

	Interbank rates	Retail rates
Spot Rs/ \$	40.45/ 40.95	40.38/ 41.02
2 month swap points	20/ 30	15/ 35

The 2 month interest rates (p.a.) quoted by the bank is 9%/ 11%. Explain the nature of transactions involved.

22. An Indian company has \$ 100000 payable and \$ 30000 receivable from a UK company. The following rates are quoted

Rs/ £	= 74.60/ 10
\$/ £	= 1.40/ 1.45

Calculate the benefit of netting for the Indian and UK Company.

23. An Indian company has a \$ 100000 payable after 3 months. The US exporter is agreeable to grant a discount of \$ 3000 in case of prompt payment. The following information is furnished.

Spot (Rs/ \$)	= 45.60/ 65
3 month swap points	= 10/15

The cost of the short term funds for the Indian firm is 13% p.a. Advice the firm?

24. Jai Bharat Industries exported handicrafts to Germany under a letter of Credit and submitted all the shipping documents to its banker on November 28, 2002. The amount of the receivable is Euro 300000. The bank could negotiate the bill on December 02, 2002 and collected an exchange margin of 0.125%. the spot exchange rates as on November 28, 2002 and December 02, 2002 are given below:

	November 28, 2002	December 02, 2002
Mumbai Rs/ \$	48.00/ 05	47.95/ 99
London \$/ £	1.5665/ 67	1.5668/ 70
Euro/£	1.6100/ 02	1.6097/ 99

You are required to calculate:

- The amount of gain or loss to the exporter due to delay in negotiation of bill under the LC.
- Actual rupee inflow to the exporter.

25. An industrial unit manufacturing motorbikes in Faridabad and exports motorbikes to Australia at a price of Aus\$ 1500/ unit.

The company imports components from South Korea and the cost of components for each unit is US\$ 250. The company entered into an agreement for the supply of 1000 units of motorbikes on January 01, 2007. The shipment will be done in the month of March and payment is expected to be received in June. The payment for imported components will also be made at the same time. The company's variable cost/ unit are Rs 12500 and the allocable fixed costs of the company are Rs 20000000. The exchange rates as on 01.01.07 are as follows:

Rs/ AUD	34.65/34.67
Rs/ USD	45.87/ 45.89

Vice President (Finance) who is observing the movements of exchange rates on a day to day basis has expected that the Rupee would appreciate against AUD and depreciate against USD.

He has estimated the following rates for 30th June, 2007

Rs/ AUD 33.80/33.82

Rs/ USD 46.20/ 46.22

You are required to find out:

- a. The change in profitability due to transaction exposure for the supply of 1000 units.
- b. By how many units should the company increase its sales so as to maintain the current profit level for the proposed shipment?

26. A firm is contemplating import of a consignment from the USA for a value of US dollars 10000. the firm requires 90 days to make a payment. The supplier has offered 60 days interest free credit and is willing to offer additional 30 days credit at an interest rate of 6% per anum. The bankers of the firm offer a short loan for 30 days at 9% per anum. The bankers' quotation for foreign exchange is:

Spot 1 USD Rs. 46.00

60 day forward 1 USD Rs. 46.20

90 day forward 1 USD Rs. 46.35

You are required to advise the firm as to whether it should

- a. Pay the supplier in 60 days.
- b. Avail the supplier's offer of 90 days credit. Show your calculations.

27. Amie operating a garment store in US has imported garments from Indian exporter of invoice amount of Rs 13800000 (equivalent to US \$ 300000). The amount is payable in 3 months. It is expected that the exchange rate will decline by 5% over 3 months period. Amie is interested to take appropriate action in foreign exchange market. The three month forward rate is quoted at Rs 44.50.

You are required to calculate expected loss which Amie would suffer due to this decline if risk is not hedged. If there is loss, then how he can hedge the risk.

28. An MNC company in USA has surplus funds to the tune of \$ 10 million for six months. The Finance Director of the company is interested in investing in DM for higher returns. There is a Double Tax Avoidance (DTAA) in force between USA and Germany. The company received the following information from London:

€/ \$ Spot 0.4040/ 41

6 month forward 67/ 65

Rate of interest for six months (p.a.) 5.95% - 6.15%

Withholding tax applicable for interest income 22%

Tax as per DTAA 10%

If the company invests in £, what is the gain for the company?

29. On 30th June 2009 when a forward contract matured for execution you are asked by an importer customer to extend the validity of the forward sale contract for US\$ 10000 for a further period of three months.

Contracted rate US\$ 1 = Rs 41.87

The US dollar quoted on 30.6.2009

Spot Rs 40.4800/ 40.4900

Premium July 0.1100/ 0.1300

Premium August .2300/ 0.2500

Premium September 0.3500/ 0.3750

Calculate the cost for your customer in respect of the extension of the forward contract.
 Rupee values to be rounded off to the nearest rupee.
 Margin 0.80% for buying rate
 Margin 0.25% for selling rate

30. Weyden Co is a Dutch based company which has the following expected transactions.

One month: Expected receipt of	£ 240000
One month: Expected receipt of	£ 140000
Three months: Expected receipts of	£ 300000

The finance manager has collected the following information:

Spot rate (£ per €)	1.7820 ± 0.0002
One month forward rate (£ per €)	1.7829 ± 0.0003
Three months forward rate (£ per €)	1.7846 ± 0.0004

Money market rates for the company:

	Borrowing	Deposit
1 year Euro interest rate	4.9%	4.6%
1 year sterling rate	5.4%	5.1%

Assume that it is now 1 April

Required:

- Calculate the expected Euro receipts in one month and in three months using the forward market.
- Calculate the expected Euro receipts in three months using a money market hedge and recommend whether a forward market hedge or a money market hedge should be used.

31. CQS Plc is a UK company that sells goods solely within UK. CQS Plc has recently tried a foreign supplier in Netherland for the first time and need to pay € 250,000 to the supplier in six months' time. You as financial manager are concerned that the cost of these supplies may rise in Pound Sterling terms and has decided to hedge the currency risk of this account payable. The following information has been provided by the company's bank:

Spot rate (€ per £)	1.998 ± 0.002
Six months forward rate (€ per £)	1.979 ± 0.004

Money market rates available to CQS Plc:

	Borrowing	Deposit
1 year Pound Sterling interest rates	6.1%	5.4%
1 year Euro interest rates	4.0%	3.5%

Assuming CQS Plc has no surplus cash at the present time.

You are required to evaluate whether a money market hedge, a forward market hedge or a lead payment should be used to hedge the foreign account payable.

32. In march, 2008, the Zed Pro Industries makes the following assessment of Dollar rates per British Pound to prevail as on 1.9.2008:

\$/ Pound	Probability
1.60	0.15
1.70	0.20
1.80	0.25
1.90	0.20
2.00	0.20

- What is the expected spot rate for 1.9.2008

- b. If, as of March, 2008, the 6 month forward rate is \$ 1.80, should the firm sell forward its pound receivables due in September, 2008?

33. Bank A in India provides the following quote –

Rs/ \$ 40.40/ 40.70

- i) Interpret the above quote.
- ii) Find out the bid ask spread and express it as a % of the mid rate?
- iii) What are the factors on which the bid ask spread depends?

34. Bank A in India quotes Rs/ \$ = 45.10/ 46.00

- a. An Indian firm has imported goods from US and needs to pay \$ 10, 00,000. What amount of Rs would be required?
- b. An American student has to pay Rs 5, 00,000 for an Indian course. What amount of \$ would be required?
- c. An Indian company has surplus funds of Rs 40, 00,000 and wants to invest in US. It therefore needs to convert Rupee into \$. What amount of \$ will it get?

35. Consider the following quotation:

Bank A Rs/ £ 92.50/ 92.70

Bank B Rs/ £ 92.60/ 92.80

Check for **two way arbitrage**.

36. Bank A in India and Bank B in US provide the following quotes:

Bank A Rs/ \$ 41.70/ 30

Bank B \$/ Rs 0.0205/ 0.0215

Find out the **Synthetic quote** and check for **arbitrage**.

37. Suppose an Indian importer has to pay a Newzeland export firm. Direct quote between Indian Rupee & Newzeland Dollars is not available. Find out **cross rates** between Rupee and Newzeland dollar with the help of following quotes.

Rupee/ US \$ 48.05/ 48.21

Newzeland \$/ US \$ 1.7908/ 1.8510

38. Bank A, B & C provide the following quotes

Bank A Rs/ £ 91.40/ 91.70

Bank B Rs/ \$ 42.50/ 43.10

Bank C \$/ £ 2.1040/ 2.1070

Show the process of **3 way arbitrage** which starts by selling Rs 10000 to Bank A.

39. Consider the following quotations by 3 banks.

A \$/ £ 2.1050/ 2.1090

B €/ £ 1.8950/ 1.9010

C \$/ € 1.0150/ 1.0180

Check for **3 way arbitrage** and carry out the same using £ 10000. (Use Cross rates)

40. Based on six month forward rate of Rs. 42.60, the annualised forward discount on \$ happens to be 10%. Find out the spot rate.

41. Based on three month forward rate of \$ 2.1020/ £. The annualised forward premium on \$ against £ happens to be 12%. Find out the spot rate.

42. Given Spot Rs/ \$ 41.60/ 41.90
 1 month swap points 40/ 50
 2 month swap points 90/ 110
 Compute the **Forward rate**.

43. Given Spot \$/ £ 2.1150/ 70
 1 month swap points 70/ 50
 2 month swap points 110/ 100
 Compute the **forward rates**.

44. An Indian firm has imported goods from Europe and has a payable of € 40000, 3 months from now. To cover the payable, in the forward market, it approaches its banker. The banker informs that Rs/ € rates are not directly available in India. So the bank decides to arrange a synthetic Rs/ € rate with the help of the rates quoted in Mumbai and New York.

Mumbai Spot Rs/ \$ 42.50/ 20
 3 month swap points 80/ 90

New York Spot \$/ € 1.1050/80
 3 month swap points 120/ 110

Find out the synthetic 3 month forward rate Rs/ € rate that will be quoted to the Indian firm if the bank requires an exchange margin of 0.3%.

45. A US exporter to UK has a £ 1000000 receivable after 3 months. His banker gives the following

Quotation-

Spot \$/ £ 1.4050/ 1.4070
 3 month swap points 110/ 130

The exporter has the following forecast for the \$/ £ rate expected to prevail after months.

Spot Rate (\$/ £) after three months	probability
1.4150	0.3
1.4170	0.3
1.4190	0.4

Advice the exporter.

46. Spot rate is Rs 52/ € and annualised forward premium on € against Rs based on 6 month forward happens to be 8%. If six month € interest rate is 5% p.a. Find out the Rs interest rate.

47. Given Spot rate Rs42/ \$
 3 month forward rate Rs 42.7/ \$
 Three month interest rate p.a
 Rs 12%
 \$ 7%

Check for IRP and carry out **covered Interest arbitrage** using \$1000 or Rs 42000.

48. Given Spot (Rs/ \$) = 46.2
 3 month forward rate = 47.2

3 month Rs interest rate = 8% p.a.

3 month \$ interest rate = 2 %

Check for **covered interest rate arbitrage** opportunity for the Indian investor and the US investor.

49. Spot rate Rs/ \$ 42.20/ 42.55
6 month forward rate Rs/ \$ 42.70/ 42.95

6 month interest rate (p.a)

Rs 11%/ 12%

\$ 6%/ 7%

Check for arbitrage from both the Indian and US investor's point of view. Begin with 10000 units of currency.

50. An Indian firm has \$ 100000 payable and £ 200000 receivable 3 months from now.

Given spot Rs/ \$ 43.50/ 43.80

3 month swap points 20/ 30

Spot \$/ £ 2.1045/ 2.1065

3 month swap points 110/ 90

3 month interest rates p.a.

Rs 10%/ 11%

£ 7%/ 8%

\$ 4%/ 5%

How should the firm hedge the payable and receivable – **Forward Cover or Money market Cover?**

51. A US fund brought \$ 100000 into India at the beginning of the year, when the exchange rate was Rs 40/ \$. He invested the corresponding Rs proceeds in the Nifty which was trading at 4000. At the end of the year Nifty trades at 4800. Find out the return to the US investor in dollar terms if –

Case (i) rupee appreciates by 8%.

Case (ii) Rupee depreciates by 8%.

52. An Indian firm needs funds for 1 year. It has the following 3 choices.

a) Rupee Borrowing – interest rate – 10%

b) Dollar Borrowing – interest rate – 6%

c) Yen borrowing – interest rate – 20%

Assuming IRP holds good, find out the effective cost of borrowing on a covered basis in each case.

53. Suppose in the previous sum there is a processing upfront fee of 2% in case of Rs borrowing, also Indian Govt. Has announced a withholding tax of 15% in case of borrowing from outside India. Which currency should the firm borrow?

54. Given Spot rate Rs 42.50/ \$

6 month forward rate Rs 43.10/ \$

6 month Rs interest rate 10% p.a.

Find out the dollar interest rate as per IRP

55. The following table shows the price of a common basket in different countries.

Country	price
---------	-------

US	\$ 100
UK	£50
India	Rs 4200
Japan	¥ 10,500

Find out the exchange rate of each currency as an indirect quote of US, using absolute PPP.

56. Spot rate 1 year ago Rs 40/ \$
Spot rate now Rs 43/ \$
Inflation last year (India) 8%
Inflation last year (US) 3%
Compute:

- Nominal appreciation of \$
- REER
- Real appreciation of \$
- Nominal appreciation of Rupee.
- Real appreciation of Rupee.

57. AMK Ltd an India based company has subsidiaries in US and UK
Forecasts of surplus funds for the next 30 days from two subsidiaries are as below:

U.S. \$	12.5 million
U.K. £	6 million

Following exchange rate information is obtained:

	\$/ Rs	£/ Rs
Spot	0.0215	0.0149
30 days forward	0.0217	0.0150

Annual borrowing/ deposit rates (simple) are available

Rs	6.4%/ 6.2%
\$	1.6%/ 1.5%
£	3.9%/ 3.7%

The Indian operation is forecasting a cash deficit of Rs 500 million.

It is assumed that interest rates are based on a year of 360 days.

Calculate the cash balance at the end of 30 days period in Rs for each company under each of the following scenarios ignoring transactions costs and taxes.

- Each company invests/ finances its own cash balances/ deficits in local currency independently.
- Cash balances are pooled immediately in India and the net balances are invested/ borrowed for the 30 days period.

58. A customer with whom the bank had entered into 3 months forward purchase contract for Swiss

Francs 100000 at the rate of Rs 36.25 comes to the bank after two months and requests cancellation of the contract. On this date, the rates are:

Spot CHF 1	Rs 36.30	36.35
1 month forward	Rs 36.45	36.52

Determine the amount of Profit or Loss to the customer due to cancellation of the contract.

59. An Indian company borrows \$ 100000 at 6% p.a. for 2 years on bullet repayment basis, interest

Payable semi-annually. The firm decided to use rollover forward cover. The exchange rates are-

Date	Spot Rate	6 month forward rate
01/01/08	42.35/ 55	42.45/ 75

30/06/08	42.85/ 43.05	43.10/ 40
31/12/08	43.25/ 50	43.60/ 90
30/ 06/09	43.95/ 44.15	44.25/ 44.50
31/ 12/ 09	44.65/ 44.85	45.05/ 45.25

Find out the effective cost of funding.

60. Rajesh Leather Goods Ltd., an Indian manufacturer exports leather goods to USA. The company is exporting 5000 units at a price of \$60. The company has imported some specialty chemicals from Europe to produce the export items. The cost of chemical per unit of leather good stands at Euro 10. The fixed overhead costs per unit come at Rs.250 and other variable overheads, including the freight cost, add up to Rs.1250 per unit. The payments for both exports and imports are due in six months.

The current exchange rates are as follows:

Rs/\$ 46.90

Rs/ Euro 40.40

After six months (at the time of settlement of payments) the exchange rate turns out as follows:

Rs/ \$ 47.90

Rs/ Euro 41.25

You are required to:

- Calculate the loss/gain due to transaction exposure.
- Based on the following additional information calculate the losses/gains due to transaction and operating exposure if the contracted export price per unit is Rs.2700:

The current exchange rate changes to

Rs/\$: 47.50

Rs/Euro : 40.80

Price elasticity of demand for the company's product in the USA is estimated to be 1.60

The Payments are to be settled at the end of 6th month.
